

Northwest Africa (NWA) 4936 and 5406

Anorthositic regolith breccia

179 and 281 g



Figure 1: Field photos of NWA 4936 (left) and NWA 5406 (right) (photos courtesy of R. Korotev and G. Hupe).

Introduction, petrography, mineralogy, and chemistry

Northwest Africa 4936 was found in 2007 in two pieces weighing 179 g (Fig. 1; Weisberg et al., 2009a). Northwest Africa 5406 as found in 2008 in several pieces (Fig. 1; Weisberg et al., 2009). They have a dark grey matrix with light colored and white clasts (Fig. 2). They also have an anorthositic bulk composition, which overlaps in both major and trace elements, with Apollo 16 regolith (Fig. 3 and 4). Additionally, the feldspathic component of NWA 4936/5406 includes some type of magnesian anorthosite (Korotev et al. 2003; Takeda et al. 2006) as opposed to the ferroan anorthosite that is common at the Apollo 16 site (Korotev et al., 2009b).



Figure 2: Cut slice through NWA 5406, illustrating the dark matrix and white anorthositic clasts (courtesy of R. Korotev)

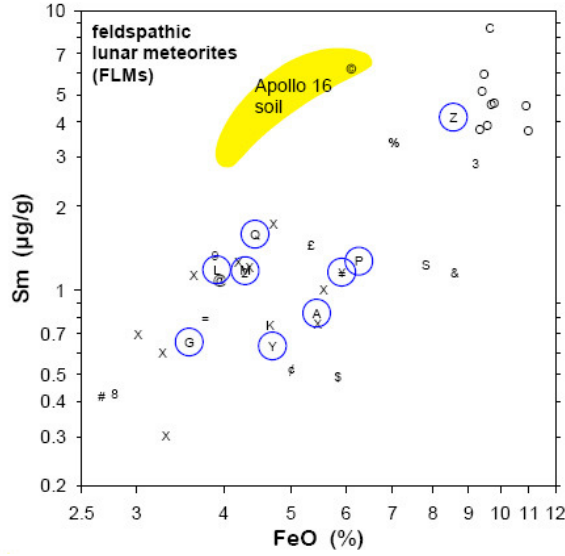


Figure 3: Comparison of Sm and FeO contents of NWA 4936 with that of other lunar meteorites and especially illustrating the overlap with Apollo 16 regolith (from Korotev et al., 2008). NWA is the symbol plotting within the yellow field.

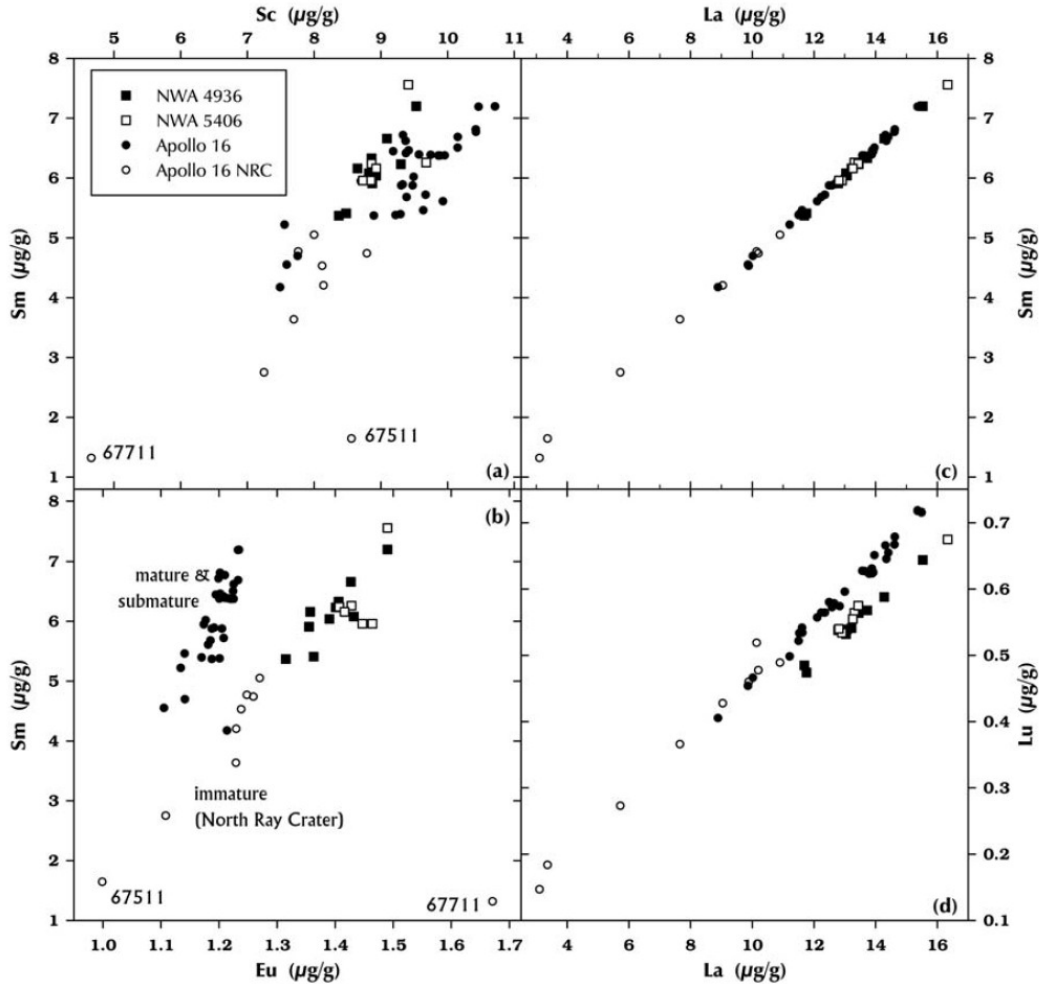


Figure 4: Comparison of trace element concentrations of NWA 4936 and 5406 with that of Apollo 16 regolith samples, especially illustrating the overlap with Apollo 16 regolith (from Korotev et al., 2009b).

Radiogenic age dating

None yet reported.

Cosmogenic isotopes and exposure ages

None yet reported.

Table 1a. Chemical composition of NWA 4936/5406

<i>reference</i>	1	1
<i>weight</i>	20-60	575
<i>technique</i>	d	e
SiO ₂ %	44.5	
TiO ₂	0.75	
Al ₂ O ₃	24.7	
FeO	5.94	
MnO	0.08	
MgO	8.6	
CaO	14.4*	
Na ₂ O	0.51	
K ₂ O	0.13	
P ₂ O ₅	0.15	
S %		
<i>sum</i>	100	
Sc ppm		8.96
V		
Cr		774
Co		39.5
Ni		572
Cu		
Zn		
Ga		
Ge		
As		0.18
Se		<0.7
Rb		<4
Sr		198
Y		
Zr		187
Nb		
Mo		
Ru		
Rh		
Pd ppb		
Ag ppb		
Cd ppb		
In ppb		

Sn ppb	
Sb ppb	
Te ppb	
Cs ppm	0.13
Ba	167
La	13.4
Ce	35.2
Pr	
Nd	20.9
Sm	6.22
Eu	1.41
Gd	
Tb	1.2
Dy	
Ho	
Er	
Tm	
Yb	4.03
Lu	0.557
Hf	4.79
Ta	0.6
W ppb	
Re ppb	
Os ppb	
Ir ppb	16.6
Pt ppb	
Au ppb	12
Th ppm	1.95
U ppm	0.49
<i>technique (a) ICP-AES, (b) ICP-MS, (c) wet chemistry (d) FB-EMPA, (e) INAA, (f) RNAA, (g) XRF</i>	

Table 1b. Light and/or volatile elements for NWA 4936/5406

Li ppm	
Be	
C	
S	
F ppm	
Cl	
Br	0.2
I	
Pb ppm	
Hg ppb	
Tl	
Bi	

1) Korotev et al. (2009b)

K. Righter, Lunar Meteorite Compendium, 2010